American Railway Engineering and Maintenance-of-Way Association.

BULLETIN NO. 15. FEBRUARY, 1902.

REPORT OF COMMITTEE No. XIV.—ON YARDS AND TERMINALS.

To the Members of the American Railway Engineering and Maintenance-of-Way Association:

Your Committee, in presenting its second annual report, desires to state that it has held monthly meetings in Chicago and Philadelphia, the Western members of the Committee attending the Chicago meetings and the Eastern members the Philadelphia meetings. The minutes of the meetings held at both points were sent to all members, and the minutes of the Chicago meeting were discussed at the following Philadelphia meeting, and vice versa. This was done so that a question brought up at either point would be discussed at the next meeting by the remainder of the Committee, and the final opinion of the Committee would be that of all its members. It was felt desirable to have an Eastern as well as a Western section of the Committee on account of the fact that the practice is not similar at both points.

As indicated in its first annual report, your Committee feels that the subject of yards and terminals is such an important one that it is clearly the duty of the Committee to cover it in a general way, by giving brief descriptions of the various important features and, in a broad manner, to define or outline the rules and principles which should primarily be considered in the design of yard and terminal facilities. Your Committee, in following this idea in its first report, submitted a list of terms and definitions, a description of a cluster (general yard) and an outline of the principles governing its design. Your Committee, in its present report, submits two plans, each showing a type of cluster (general yard) as outlined in its first report. It also submits a description of the following features and an outline of the principles governing their design:

Freight-car repair yard.
Passenger-coach and car-cleaning yard.
Inbound freight house.
Outbound freight house.
Transfer house.
Industrial district yard.
Division terminal yard.

There is also an Appendix to the report of the Committee on Yards and Terminals, containing much information relative to the dimensions of existing freight-houses, roadways and platforms, grades of streets, size of wagons, etc., obtained by the Committee in response to a circular letter sent to members of the Association located in a number of important cities.

PLANS SHOWING TYPES OF CLUSTER (OR GENERAL YARD).

Two plans are submitted. They are designed in accordance with the recommendations of your Committee made in its first report. The clusters (or general yards) are especially designed to eliminate interference in the operation of yards from all causes. In preparing the plans it was found that less interference was caused to switching and road movement and the main tracks less obstructed where the engine-house is located in the center of the yard and the main tracks spread about or run around the yard; both of the types of cluster (general yard) submitted are designed with this end in view. In one of them the yard embraces receiving, separating, classification, storage and departure tracks; in other words, it has the complete series. The yard could be operated either as a poling or summit yard. The length of tracks shown is merely assumed, and could not, of course, be followed in any particular case; to meet most situations the tracks would have to be longer than shown on the plan. Tracks for special purposes, of course, would have to be developed to suit each particular locality, and they are not provided for on either of these designs. In operating a yard as shown, probably one track in the classification and one track in the separating yard would be assigned for cripple cars, and from these tracks the cars would be moved to the regular repair yard.

In the second plan the more common practice of having merely receiving, separating or classification and storage tracks is pursued. Departure tracks are not shown; they cannot usually be provided on account of the great length of the yard which they involve.

In submitting these plans for adoption the Committee desires it to be understood that they are merely types. The plan for any particular location must be developed to suit the requirements thereof.

In either of the plans the "summit" feature can be developed nicely by locating mounds between the receiving, separating and classification yards. Were it necessary to locate the cluster on a grade falling in one direction, it would usually be policy to change the arrangement of the yard; in other words, to locate the receiving yards for cars going in both directions at the upper end of the cluster (or general yard), so that the switching would all be done in the direction of the grade. This would occasion some change in the detail.

FREIGHT-CAR REPAIR YARD.

Geographically a repair yard should be located at or near the terminal or point where cars are naturally made empty. The location selected should be such that labor and material can easily be obtained. Locally

the yard should be so located that cars to and from the cluster (or general yard) and local yards and unloading points can easily be switched in and out of it without stopping work on more than the one repair track used or interfering with general yard switching. It should also be near enough to these points that switching will not be expensive.

Repair yards should be composed, as a general rule, of short tracks, of a capacity of ten (10) or fifteen (15) cars each, so arranged that they will be in pairs; the tracks of each pair should be spaced sixteen (16) feet apart centers, and the pairs should be spaced forty (40) feet apart centers.

The material supply yard for this type of repair yard should be located at the end of the repair tracks, so that material can easily be trucked into the openings between the tracks and along these openings to any point in the repair yard.

Part of the yard should be provided with air and water-pipes for testing refrigerator and other cars. Air and water connections should be spaced fifty (50) feet apart. The yard should also be drained.

In calculating the size or capacity of repair tracks, cars should be considered fifty (50) feet long, so that there will be an open space of ten (10) or twelve (12) feet at the end of each car for handling material, trucks, etc.

At points where nearly all the work done is light repairs it will sometimes be of advantage, on account of lack of room, to space part of the tracks sixteen (16) feet centers. On account of the small amount of material required in making light repairs, it can easily be moved to any car located on tracks thus spaced.

Long repair tracks are objectionable because of the difficulty in switching out the repaired cars and the delay in waiting for the entire cut of cars to be repaired. The yard should be lighted. If it is not necessary to work at night, the yard should be switched at that time, so as not to interfere with the work. Less switching and delay will be had where light repair cars are kept on tracks separate from the heavy repair cars. Light repairs are sometimes made on the yard tracks, and it will quicken the movement of cars to so arrange that there will be a track for holding cripple cars between the receiving and separating yards of a cluster (general yard). Tinker or very light repair cars should in nearly all cases be repaired on the track on which the cars stand; they should not be moved to the regular repair yards or tracks except in exceptional cases.

The plan attached is only one of many possible types, but it illustrates the principles.

PASSENGER-COACH AND CAR-CLEANING YARD.

Geographically the location should be at the terminal or end of train run, and locally it should be such a location as is easy of approach to and from the terminal station or end of train run.

A "Y" track for turning trains is almost always necessary, and the movement to or from it and the yard and station should be free. In large cities the value of land will often prevent the building of a "Y," and in

such cases a turntable capable of handling the largest car seems to be a necessary adjunct.

In order to avoid empty mileage and delay, this yard should be near the terminal station. It is sometimes of advantage to have it connected at both ends, but tracks connected only at one end are usually used. The yard should be composed of tracks spaced about twenty (20) feet center to center. Some space can be gained by putting them in pairs, with the tracks of each pair sixteen (16) feet centers, and the pairs thirty-six (36) feet centers. Where the value of land limits the size of the yard, and thus controls the spacing of tracks, it is felt that tracks can be reduced to fourteen (14) feet centers. This is minimum and should not be used where the greater distance can be had; it will allow the men to pass.

In some cases it will be quite an advantage to have the yard (or at least a few of its tracks) connected at both ends. If the yard is not connected at each end, at the blind end of tracks, and running at right angles thereto, a car cleaners' supply building should be located, with a space between the building and the end of tracks sufficient for the trucking of material to any of the openings between them. The building should be of sufficient size for all supplies, for electrical arrangements, boilers, dynamos, compressed-air plant, steam-heat, gas, repair material, dining and sleeping car supplies, oil, waste, etc. If the yard is connected at both ends, this building will have to be at one side, but the yard will usually work to better advantage with it at the end on account of the ease with which material can be trucked to any point in the yard.

The yard itself should be provided with water, steam and air pipes running down between alternate tracks, and, where necessary, with proper arrangements for furnishing gas and electricity. The connections should be spaced fifty (50) feet apart. The yard should be sewered between each pair of tracks. Some kind of permanent staging should be provided between each set of tracks, from which the cleaning can be done, and which will give the men employed there an opportunity to readily reach the roof of the car as well as the lower parts; a system of poles and brackets, or a trolley arrangement from overhead supports, is suggested. The yard should be well paved or planked, to allow of drainage and of being kept clean and free from dust. A permanent paving is desirable; planking is not, as the use of soap, acids, water, etc., in cleaning will soon cause it to rot. The tracks should be of sufficient length to handle trains without cutting them. In designing the yard, the length of trains to be handled should be considered, so that the tracks may be made of proper length; where more short tracks are required the ladder can be made to run each way (see sketch of "Freight-Car Repair Yard"). The yard should be lighted so that work can be done at night where necessary.

The sketch attached is only one of many possible types of car-cleaning yards. The first, third and fifth pairs of tracks from bottom are 16 feet centers; all others 20 feet.

INBOUND FREIGHT HOUSE.

If possible, it is well to locate an inbound freight house so that the empty cars made at the outbound houses or transfer houses can be moved directly to the inbound houses without interference or delay. In some cases, by having adjoining houses, they can be used without being switched. The location should be as convenient as possible to the business district; approach from it should be by streets the grade of which is not great enough to burden the teaming community, say not over four (4) per cent; this figure, however, will vary in each locality. In Chicago, where there are practically no grades, a four (4) per cent grade is burdensome; this would not be the case in Pittsburg, where many of the street grades are as high as seven (7) per cent.

On account of the speed with which the cars in inbound houses can be unloaded it is not often of advantage to have over two (2) tracks at the house; thus it is only necessary to unload through one car. Unloading through cars is always objectionable, as it makes the spotting of cars at the freight house necessary, unless eight (8) or ten (10) foot platforms are provided between tracks, and this spotting consumes time in getting the cars in shape for unloading at the house, thus reducing the capacity and increasing the cost. The platforms should be provided wherever space will permit of it. The arrangement of tracks should be such that the cars at the house can be pulled out and new loads set in a minimum amount of time; this is usually provided for by a small auxiliary yard, about as shown on the sketch. It should hold at least as many cars as the freight house tracks accommodate. A cut of empties is pulled back to one of the tracks in the yard and a new cut of loads shoved in. The second cut of empties is pulled out from the house and the second cut of loads shoved in. The empties are then all taken to the cluster (general yard), or to the outbound house, and a new supply of loads set in the smaller yard ready to be switched as soon as those at the house are empty. The track approach to the freight house from the main tracks should be such as not to cause delay. Where the small yard cannot be provided, a lead track should at least be built, to avoid switching on the main tracks.

The proper width of inbound freight houses is fifty (50) feet. The proper length depends upon the amount of business to be done and the allotment of ground for the building. This also sometimes affects the width of the house.

The proper minimum width of the roadway where the inbound house is on one side of it and a wall on the other side is thirty (30) feet.

The proper minimum width of roadway where the inbound house is on one side of it and a team track or in or outbound freight house is on the other side is forty (40) feet.

The proper additional width, or the distance that the inbound house should be set back from the street where it is parallel to the street, for a space in which teams are to stand when wagon is backed against the freight house, is twenty (20) feet.

Between the side of the house and the near track there should be a platform eight (8) or ten (10) feet wide, to obviate the necessity of spotting cars at doors.

Inbound freight houses will frequently have to store large quantities of freight, and, in order to do this, and not interfere with the prompt movement of business on the first or ground floor, it is frequently necessary to build such houses several stories high, the upper floors to be used for storage. These floors should be spaced ten (10) feet apart in the clear, and material should be lifted to them in elevators and endless-chain conveyors. The lower floor is sometimes arranged to slope slightly in the direction of the load, though not much is gained by this.

The business to be accommodated must govern the style of structure, considering volume, kind and character of traffic, the time it must remain on the floor, etc. In large cities, inbound houses usually are separated from outbound and transfer houses, due to lack of room to combine them. It is best, however, where possible to do so, to at least have the in and outbound houses close together, so as to decrease the amount of light wagon mileage to a minimum; where they are together, a wagon will deliver and remove a load with no light mileage. In small towns and cities the houses should usually be combined. It is desirable to provide inbound houses with an overhead crane reaching over two tracks, a platform and a roadway, to admit of the transfer of heavy loads from car to car, platform or wagon. A cold-room should usually be provided for storing butter, eggs and other refrigerator-car freight awaiting delivery. In winter this room can be used for fruit, to prevent freezing. Checkers' offices should be located at proper intervals; they should be properly heated in winter. Electric lights on extension cords for use in cars and houses should be provided; they will soon repay their cost in quickened service. The cords should be of such length as to allow the lights to be moved about, hung on hooks, etc.

Protection against fire should be provided by placing hydrants at intervals throughout the house about one hundred (100) feet apart, each hydrant to be connected with proper length of canvas or other hose arranged on reel or folded in box, or stretched out at length on a shelf so that it can be put into instant service, and arrangements should be made with the city authorities for fire-alarm box and outside hydrants where possible. In a recent fire on the Lehigh Valley R. R. the blaze spread so rapidly that the inside protection was not available. Water-barrels, buckets and extinguishers should be provided at proper intervals.

It is most important to provide a good, smooth floor; it accelerates the work of trucking and reduces the cost thereof, likewise decreases the amount of loss from rough handling. Hard maple makes a very good, cheap floor, and will wear for years where not exposed to moisture.

Two plans are attached, one showing the ordinary type of inbound house and the other a possible type in which inbound, outbound and transfer houses are consolidated.

OUTBOUND FREIGHT HOUSE.

If possible, it is well to locate an outbound freight house so that the empties made at the inbound house can be moved to it without interference or delay. In some cases by adjoining houses they can be used without being switched. This plan cannot often be used, however, as unless cars for certain designated points have fixed locations, truckers are liable to make mistakes and put freight in the wrong cars. The location should be as convenient as possible to the business district. The approach to it should be by streets the grade of which is not great enough to burden the teaming community, say not over four (4) per cent; this figure, however, will vary in each locality; in Chicago, where there are practically no grades, a four (4) per cent grade is burdensome, but this would not be the case in Pittsburg, where many of the street grades are as high as 7 per cent.

On account of the delay in getting a full load into cars at outbound houses they must remain at the house a considerable time, usually all day. In large cities the tonnage shipped to many points makes it necessary to have a separate car for each station to which a necessary amount of freight is shipped. There must also be cars for the local or peddler business at small stations along various routes, each such route requiring a car. In this way the total number of cars which must be set at an outbound house is sometimes very large, and, in order to get the proper number, it is frequently necessary to load through four, five, six and sometimes seven cars. It is most important, therefore, in designing such a house to ascertain the proper number of cars which should be placed for loading at the house, and a liberal surplus for the demands of the future should be arranged for. The ordinary outbound house is shown on sketch attached, on which it is arranged to load through four or five cars. If necessary to load through more than four cars, it is advisable to see if the house cannot be enlarged in other ways.

There should be connected with these tracks a small yard for the quick switching of them, so that it will not have to be done on the main track. If possible, the capacity of this yard should be at least as large as the car capacity at the house. This small yard is not as necessary here as it is at the inbound house. The movement from outbound houses is usually made only once a day, except in cases of special shipments, and these latter are loaded into cars at the end of the track nearest the main track, so that they can be switched or moved without interfering with other cars at the house. Between the side of the house and the near track there should be a platform eight (8) or ten (10) feet wide to prevent spotting cars at doors; also, where room is available, it is of great advantage to construct platforms about eight (8) or ten (10) feet wide between the tracks, in order to avoid the necessity of spotting cars.

Another type, although not so common, is to have the house abut upon a street and the tracks run up to it at right angles. Between each pair of tracks there should be a covered platform about twelve (12) feet wide. This house has the advantage of being able to get a large number of cars at the house without the necessity of loading through cars. The average

length of the truck haul is usually decreased. Such an arrangement is frequently made where it is desirable to consolidate an in and out bound and a transfer house at one point. On one side is built the inbound house, on the other the outbound house, and between them the office. Cars to be transferred are set on the various intermediate tracks. The advantages of such a house are that the empties made at the inbound and transfer houses are quickly turned over to the outbound house, or can be used for outbound shipments, if necessary, without switching. It gets a large number of cars at the house and enables the local agency to make shipments, on account of the cars being transferred, to many points quickly. It has the advantage of consolidating three features—an inbound, an outbound and a transfer house—under one set of officers and one agent. This tends greatly to reduce the cost and also to quicken the service. The tracks at all these houses should be arranged so as to require the least amount of switching and so that it can be done in the least time. The track movements from the large cluster (or general yard) to the freight house should be such as not to require time or to be blocked; it should be a free movement. Connected with this house should be a small yard, about as shown on sketch, to enable the ready switching of the cars.

The proper width of outbound houses is twenty-five (25) feet.

The proper length depends upon the amount of business to be done and the allotment of ground upon which the building is built. This also sometimes affects the width of the house.

The proper minimum width of roadway where an outbound house is on one side of it and a team-track or in or outbound house on the other side is forty (40) feet.

The proper minimum width of the roadway where the outbound house is on one side of it and a wall on the other side is thirty (30) feet.

The proper additional width, or the distance that the inbound house should be set back from the street where it is parallel to the street, for a space in which teams are to stand when wagon is backed up against the freight house is twenty (20) feet.

The business to be accommodated must govern the style of structure, taking into consideration volume and character of traffic and the time it will have to remain on the floor, etc. In large cities outbound houses are usually separated from inbound and transfer houses, due usually to lack of room to combine them. It is best, however, where possible to do so, at least to have the in and outbound houses close together, so as to decrease the amount of light wagon mileage to a minimum. Where they are together a wagon can deliver and remove a load without any light mileage. In small towns and cities the houses should usually be combined.

It is desirable to provide outbound houses with an overhead crane reaching over two tracks, a platform and a roadway, which will admit of the transfer of heavy loads from car to car, platform or wagon. A cold-room should usually be provided for storing butter, eggs and other refrigerator-car freight awaiting loading. In winter this room can be used for fruit or vegetables, to prevent freezing. Checkers' offices and scales

should be located at proper intervals; scales should usually be provided at each door. These offices should be properly heated in winter. Electric lights on extension cords, for use in cars and houses, should be provided. They will soon repay their cost in the quickened service. The cords should be of such length as to allow the lights to be moved into cars, hung on hooks, etc.

Protection against fire should be provided by placing hydrants at intervals throughout the house, usually about one hundred (100) feet apart, each hydrant to be connected with proper length of canvas or other hose arranged on a reel or folded in a box, or stretched out at length on shelves, so that it may be put into immediate use. Where possible, arrangements should be made with the city for fire-alarm box and for outside fire-hydrants. In a recent fire on the Lehigh Valley R. R. the blaze spread so rapidly that the inside protection was not available. It is also well to provide water-barrels, buckets and extinguishers at proper intervals.

It is most important to provide good, smooth floors. It facilitates trucking and reduces the cost thereof, also decreases the amount of loss from rough handling. Hard maple makes a good, cheap floor and will wear for years, where not exposed to moisture.

Three plans are attached, one showing the ordinary type of outbound house, a narrow house with parallel tracks; a possible type, not so common, with narrow house and tracks running up to the same and at right angles to the house, covered platforms being provided between tracks; also a possible type in which the inbound, outbound and transfer houses are consolidated. These, of course, are merely types, showing possible developments. Many others could be furnished.

TRANSFER HOUSE.

Geographically the location should be at some junction point or points where there is a coming together or bunching up of the traffic and where there is a yard and a natural lay-over point at which the traffic is switched and trains are broken up, or at a point where one railroad terminates and another begins and it is desired to avoid having the cars of one road run on the other road. Locally, where possible to do so, it should be located with the in and outbound freight houses, so that one agent and one set of foremen may have charge of all.

The purpose of a transfer house is the consolidation of less-than-carload lots into carload lots and the breaking up of cars containing shipments to many points and consolidating them into cars containing shipments for only one point or route, or the transfer of freight from car to car to avoid the use of foreign cars. In order to do this it is necessary to be able to set a large number of cars at the house. A transfer house makes cars, or, in other words, by consolidation releases loaded equipment. It is, therefore, of some advantage to have it located at such a point where the equipment thus released can be used.

It is usually made up of a series of tracks in pairs, with covered platforms about twelve (12) feet wide separating each pair. It should be

so located that the supplying of cars for the transfer house to and from the yards can be done without delay.

In second-class cities, or at junction points, the transfer house must in most cases be considered in connection with the regular station work and should be designed with this end in view. The same care to provide proper fire protection, good floors, cranes for heavy loads, proper lighting, etc., should be taken as in the case of inbound houses.

The attached plan shows a type of transfer house consolidated with in and outbound freight houses.

INDUSTRIAL DISTRICT YARD.

Large cities are usually divided into what are called industrial or switching districts. In each of these districts one or more engines are required to switch the team-track, freight house, business sidings, etc. If the terminal cluster (general yard) is some distance from these districts, it is customary to run cars into the district from the cluster (general yard) to a small district yard by what is called a transfer engine. These engines leave the cars in the district yard and they, in turn, are then delivered by the district engine to the point where needed.

The yard is usually only a number of parallel tracks, on which cars are set. These parallel tracks should be so arranged with a switching lead that they can be switched without interference with the main track, about as shown on the attached plan.

DIVISION TERMINAL YARD.

At many points this type of yard is only needed for trains to pull into, change engines and cabooses, cut off or add a few cars to correct the tonnage for the next division, and pull out, such a movement being called by the English "a bull-pen" movement.

In connection with this yard there should be a small lancing yard in which to put cars for the local trains in station order. (At points where the amount of additional business is great and trains must be broken up into many new parts, the yard takes on the features of a terminal cluster and should usually be so designed.)

In this type of yard it is most important to get the movement of engines from house and coal-dock to and from yard so planned that there will be no interference or delay. The yard is usually at a division end and is primarily a holding-place while engines, crews and cabooses are changed. It is at the intermediate end of train runs and any land upon which the yards can be built will answer. It should, however, be so located that the men can get to and from it without much inconvenience, and that cars for the city or town in which the yard is located can be switched to and from the city delivery tracks or freight houses without delay. It should not be located on a limiting grade unless it runs with the traffic. When the necessity for breaking up trains exists, the yard will then assume the features of a cluster (or general yard). The size of the yard depends

upon the volume of business and is best measured by the number of trains arriving per hour. The location of the engine house is most important, but must be governed almost entirely by local conditions. It should be studied with much care, so as to locate it where the movement of engines to or from the yards will cause a minimum amount of interference. The plan attached illustrates one of the many simple types of division terminal yard.

In order to get its subjects well in hand your Committee has not gone into the minor details of the various matters treated, but has tried to bring out the principles or rules most essential in the consideration of design. This is done in order that it may cover the entire ground in a general way at the earliest possible time, thus giving the Association the greatest amount of information in the least time, the smaller details on each subject to be developed in future reports. It should be remembered that, from its very nature, the Committee is almost limited to principles and not details. Illustrating this, it would not be proper for the Committee to outline the construction of a freight or transfer house or the manner of building a track; it is, however, within its province to describe the manner of operating a freight or transfer station or the switching of a yard or terminal. Therefore, in giving these descriptions, many of the details which enter into the maintenance and engineering questions involved in the proper handling of the whole property will be brought to the attention of the Association by your Committee in its future reports.

CONCLUSIONS.

Your Committee begs to submit the following conclusions for adoption by the Association:

Cluster (or General Yard).—In the development of a cluster (or general yard) less interference is caused to switching and road movement, and the main tracks are less obstructed, where the engine-house is located in the center of the yard and the main tracks run around the yard.

Freight-Car Repair Yard.—A repair yard should be composed of short tracks. The spacing of tracks on which light repairs are to be made should be less than that for tracks on which heavy repairs are to be made.

Passenger Coach and Car Cleaning Yard.—The yard should be at such a location as to be of ready and quick access to and from the station. The tracks should be of such length that they will accommodate trains without cutting. Better results will usually be obtained with stub tracks and a car cleaners' repair and supply building located at right angles to them at the stub end of tracks.

Inbound Freight House.—This house should be of such width as will furnish a reasonable amount of floor space for the holding of freight. (Fifty (50) feet is a good average width.) Usually not over two tracks are needed. These tracks should be provided with platforms to avoid the necessity of spotting cars.

Outbound Freight House.—In order to decrease trucking at this house it should be of narrow width. (Twenty-five (25) feet is a good average width.) It is of advantage to have a great number of cars at the house so that all freight can be loaded into the cars direct. It is not advisable to load through more than four (4) cars. To prevent the necessity of spotting cars, the tracks should be separated by platforms. Where a great number of cars are required the trucking distance will usually be decreased by having stub tracks running up to the freight house, which is at right angles to them: these tracks to be separated by covered platforms leading to the freight house. In addition to decreasing the trucking distance, this type avoids trucking through cars.

Roadways.—Where the freight house is on one side and a wall on the other side, the proper minimum width of roadway is thirty (30) feet. Where a freight house is on one side of it and a team track or other freight house is on the other side, the proper minimum width of roadway is forty (40) feet.

Transfer House.—A transfer house should be located at a point where there is a coming together of the traffic and a necessity exists for its consolidation, and where the loaded equipment made empty can be used.

Respectfully submitted,

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Committee.

APPENDIX TO REPORT OF COMMITTEE ON YARDS AND TERMINALS.

In order to ascertain the actual conditions existing at large terminals, a circular letter was sent out to officers in a number of cities, and the information thus obtained is presented herewith in order that it may be on record:

BOSTON, MASS.

Boston & Maine R. R.—Mr. F. O. Melcher, Superintendent of the Fitchburg Division, sends the following statement:

1. Width of inbound freight houses.....40 feet.
   Width of outbound freight houses.....30 feet.
2. Width of platform along outside of freight houses.....No platforms.
3. Width of platform for trucking between tracks.....None.
4. Width of driveways in yards where one or both sides are used for loading or unloading (clear width between sides of cars).....27 to 35 feet.
5. Width of driveways at freight stations, where one or both sides are used for loading or unloading.....45 feet.
6. Street grades in business districts.....Practically no grades.
7. Average and maximum loads of wagons, in tons.....4 tons.
   Greatest load known here.....24 tons.
8. Total length of wagon, including horses, 2-horse team, 25 feet; 4-horse team.....45 feet.
9. Length of wagon with horses turned.....20 feet.
10. Width of wagons, over all.....10 feet.

BUFFALO, N. Y.

No.	Name of Railway.	Driveway or Teamway.	Location.	Width. Ft.
1	Lehigh Valley...	Driveway...	Scott Street (Freight House)..	48.5
2	" " ...	Teamway....	Washington and Scott Streets.	16.3
3	N. Y. Central....	Driveway...	Carroll Street (Freight House).	38.
4	" " ...	Teamway...	Chicago and Carroll Streets...	29.
55	" " ...	" ...	" " " " ...	28.3
6	Pennsylvania....	Driveway...	Carroll Street (Freight House).	38.
7	" ...	Teamway...	Louisiana and Carroll Streets..	26.7
8	Erie.....	Driveway...	Exchange St. (Freight House).	54.
9	L. S. & M. S....	" ...	Louisiana St. (Freight House).	33.5
10	" " ...	Teamway...	" " " " .	22.
11	Wabash	Driveway...	" " " " .	42.3
12	N. Y. Central....	Teamway...	Perry Street	16.3

For Nos. 1, 3, 6 and 8 the width given is the clear width to curb line, these freight houses being built on the street line.

No. 11 has no teamway.

No. 12 is for loading grain.

The streets are generally level; the maximum grade is 4 per cent.

Mr. G. F. Morse, Assistant Engineer of the Lehigh Valley Railroad, sends the following: The condition in Buffalo is such that local conditions govern the width of freight house and distances between tracks for team delivery driveways. The following tables will show the measurements of the houses and driveways as they exist. All houses are used for both inbound and outbound business.

Description.	Width of House.	Width of Driveway in Front of House.
L. V. R. R.; Scott Street	25 feet.	48.5 feet.
N. Y. C. & H. R. R. R.; Carroll Street	49 "	38.0 "
P. R. R.; Carroll Street	38 "	38.0 "
Erie R. R ; Exchange Street	*69 "	54.0 "
L. S. & M. S. Ry.; Louisiana Street	50 "	34.0 "
Wabash R. R	25 "	42.9 "

* Two tracks inside of house.

All houses except those of the Wabash Railroad front on a street, and the width of the driveway is governed by the curb on opposite side of street. The driveway in front of the Wabash Railroad houses is measured to the cars standing on the track opposite the house.

The above are the principal local delivery freight houses in Buffalo. There are other houses where the freight is delivered from cars to boat, and vice versa. These houses are of all widths upward of 100 feet, the widths being governed by a street on one side and dock on the other. The only case where the width was not governed by local conditions is in the Lehigh Valley Railroad lake freight houses, which are 116 feet wide, with two tracks in the inside of the house next to the wall.

Width of teamways or track delivery roadways (distances given are between cars standing on track):

L. V. R. R., Scott St. ..... 16.3 feet.
N. Y. C. & H. R. R. R., Chicago St. ..... 29 feet.
P. R. R., Louisiana St. ..... 27 feet.
L. S. & M. S. R. R., Louisiana St. ..... 22 feet.
N. Y. C. & H. R. R. R., Perry St. ..... 16.3 feet.

The New York Central & Hudson River Railroad roadway at Perry street is used for loading grain, the wagon standing parallel with the tracks.

The maximum grade for streets in Buffalo is 4 per cent, excepting a few streets in the residential section. The entire business section is practically level, the grades occurring on the approaches of the viaducts and subways over and under the railways, which are 4 per cent in all cases.

The measurements of wagons used in Buffalo vary from the small grocery wagon to the very large trucks. The largest are 8.2 feet wide over all; the width of roadway occupied by wagon with horse turned at right angles is 18.3 feet. Grain trucks are generally 7 feet wide and of various lengths. In all cases these trucks stand parallel to cars when loading.

CHICAGO, ILL.

Tables A and A¹ have been prepared by Mr. C. S. Sims, Superintendent of the Chicago Division of the Pennsylvania Lines, and Chairman of this Committee. It gives the measurements of driveways at the freight houses in Chicago, and the distance between team tracks; also the measurements of wagons, giving total length and length with horses turned at right angles.

The measurements of driveways and teamways were made between curbs when paved, and between cars when not paved, as in most cases the curbing was directly under the side of the car.

All items marked (*) are used for loading at one side only; all others can be used at both sides.

Chicago & Northwestern Railway.—Mr. R. H. Aishton, General Superintendent, has furnished a tabular statement for all the company's Chicago freight houses, which was specially prepared for the purpose by Mr. R. C. Sattley, Engineer of Bridges and Buildings. This statement is given in Table B.

Illinois Central Railroad.—Mr. H. McCourt, Superintendent, has furnished the following statement in relation to his company's freight houses and team traffic in Chicago.

1. Width of inbound freight house.....100 feet.
   Width of outbound freight house..... 56 feet.
2. Width of platform along outside of freight houses..... 8 feet.
3. We have no platforms for trucking between tracks.
4. Width of driveway in yards, where one or both sides are used for loading or unloading between sides of cars..... 25 feet.
5. Width of driveways at freight stations where one or both sides are used for loading or unloading varies....Average 30 feet.
6. Street grade in business district.....Practically level.
7. Average and maximum load of wagons....3.5 and 5 tons, respectively.
8. Total length of wagon, including horses.....Average 22 feet.
9. Length of wagon with horses turned.....14 to 16 feet.
10. Width of wagon, over all..... 7.5 feet.

CINCINNATI, O.

Cleveland, Cincinnati, Chicago & St. Louis Railway.—Mr. Geo. W. Kittredge, Chief Engineer, has furnished the following information relating to the Central Avenue freight house in Cincinnati. This building has the inbound and outbound platforms under one roof, separated by a 64-foot driveway.

1. Width of inbound house, 33 feet 4 inches; outbound house .....24 feet 8 inches.
2. Width of platform along outside of freight house.....6 feet.
3. Width of platform for trucking between tracks.....5 feet.
4. In the bulking yard adjacent to the freight house the driveways are 30 feet wide between sides of cars.
5. Width of driveways at freight station where both sides are used for loading or unloading.....65 feet.
6. Street grades in business districts run as high as 12 per cent maximum.
7. Maximum load of wagons in tons (one-horse wagon).....2 tons.
8. Length of wagon, including horses.....24 feet.
9. Length of wagon with horses turned.....12 feet.
10. Width of wagon, over all.....6 feet 4 inches.

NEW YORK, N. Y.

New York Central & Hudson River Railroad.—The statement given in Table C has been furnished by Mr. W. J. Wilgus, Chief Engineer, who also gives the following general list of maximum grades in the business districts of New York City, south of Forty-second street:

34th St., Lexington to Park	.5 per cent.
35th St., 3d to Lexington	.5 "
36th St., 3d to Lexington	.6 "
37th St., 3d to Lexington	.6 "
Park Ave., 40th to 42d St	.4 "
5th Ave., 35th to 37th St	.5½ "
7th Ave., 24th to 26th St	1.7 "
38th St., 11th to 12th Ave	1.1 "
Wall St., Broadway to Nassau	1.7 "
23d St., 5th to 6th Ave	.6 "
Broadway, 14th to 17th St	.2 "
40th St., Lexington to Park Ave	4.7 "
Rector St., Broadway to Church St	.5 "

The loads of wagons range from 100 pounds to a maximum of 5 tons. The total length of wagons, including horses, is 29 feet; length with horses turned, 15 feet 6 inches; maximum width of wagons over all, 7 feet 6 inches.

NEW ORLEANS, LA.

Illinois Central Railroad.—Mr. O. M. Dunn, Superintendent at New Orleans, sends the following information:

"Buildings used by us for inbound and outbound freight houses are, with one exception, old cotton compress buildings, remodeled to meet our requirements and are not uniform in width; some are closed and others are open and range in length from 200 to 310 feet, being located on city squares of ground with streets intervening. These warehouses vary in width from 52 to 71 feet; some of them are closed on four sides and others are open sheds on the side next to the track. In addition to these warehouses we have a number of cotton sheds varying in width from 100 to 124 feet; they are open on all four sides. We have one shed 90 feet in width and 500 feet long, in which we handle perishable business. We have two double outward warehouses with a driveway in the center, 35 feet in width.

"The grades of the streets in New Orleans are uniformly level. The average load of a wagon is about 2½ tons, the maximum load being 4 tons. The total length of wagons, including horses, is 42 feet. Total length of wagon with horses turned, is 20 feet. Width of wagon, 6½ feet over all."

PHILADELPHIA, PA.

Philadelphia & Reading Railway.—The following information has been furnished by Mr. W. G. Besler, General Superintendent:

1. Width of inbound and outbound freight houses.....37 feet.
2. Width of platform along outside of freight houses.....6 feet.
3. Width of platform for trucking between tracks.....15 feet.
4. Width of driveways in yards where one or both sides are used for loading or unloading (clear width between sides of cars).....about 26 feet.

5. Width of driveways at freight stations, where one or both sides are used for loading or unloading. At Thirteenth and Callowhill streets the width between inbound and outbound buildings is .....60 feet.
6. Street grade in business district (average and maximum)..5 per cent.
7. Average and maximum loads of wagons; two-horse teams, 2 net tons; some three-horse teams haul five tons.
8. Total length of wagon, including horses, average, 26 feet 6 inches; maximum, 27 feet 6 inches.
9. Length of wagon with horses turned, average, 18 feet; maximum, 19 feet.
10. Width of wagon, over all: Average, 6 feet 2 inches; maximum, 6 feet 5 inches.

PITTSBURG, PA.

Pittsburg & Lake Erie Railroad.—To Mr. J. A. Atwood, Chief Engineer, the Committee is indebted for a set of sketch plans of all the freight stations in Pittsburg and Allegheny. As the actual layouts in various cities differ so widely (owing largely to local conditions), and as your Committee's purpose is rather to lay down governing principles than to show actual existing plans, it has not been deemed advisable to reproduce these plans with the report. The following is a summary of the information given:

	Maximum. Ft.	In.	Minimum. Ft.	In.	Average. Ft.	In.
1. Width of inbound and outbound freight houses	205	0	13	6	68	0
2. Width of platform along outside of freight houses	24	6	3	6	12	0
3. Width of platform for trucking between tracks	12	0	8	6	10	3
4. Width of driveways between tracks where one or both sides are used for loading or unloading (clear width between sides of car)	65	0	18	0	31	0
5. Width of driveways at freight stations where one or both sides are used for loading and unloading (only one in Pittsburg)	37	6	.....		.....	...
6. Street grades in business districts	3.7½%		.....		3%	
7. Average and maximum load of wagons						
8. Length of wagon including horses	26	6	22	0	24	3
9 Length of wagon with horses turned	16	6	12	6	14	6
10 Width of wagon over all	.....		.....		6	6

ST. LOUIS, MO.

Mr. A. J. Davidson, General Superintendent of the St. Louis & San Francisco Railroad, has furnished a tabulated statement for several of the railways in that city, and this is given in Table D.

SAN FRANCISCO, CAL.

Southern Pacific Railway.—Mr. J. L. Frazier, Superintendent, has furnished answers to the questions asked as nearly as practicable. There are a large number of freight sheds which differ in width and length. The teams which handle freight vary in size from small wagons hauling 1,000 pounds or more, to immense four-horse trucks hauling 10 tons. The surface of the city is much broken up; the business portion of it, however, is practically level.

1. Width of inbound and outbound freight houses.....30 to 75 feet.
2. Width of platform along outside of freight houses.....4½ to 5 feet.
3. Width of platform for trucking between tracks.....None.
4. Width of driveways in yards where one or both sides are used for loading or unloading (clear width between sides of cars).....40 to 45 feet.
5. Width of driveways at freight stations, where one or both sides are used for unloading or loading.....48 to 51 feet.
6. Street grade in business districts.....Ave., 0.5%; max., 4½%
7. Average and maximum load of wagons.....1 to 10 tons.
8. Total length of wagon, including horses.....20 to 40 feet.
9. Length of wagon with horses turned.....12 to 30 feet.
10. Width of wagons, over all.....5½ to 9 feet.

TABLE A[1]—MEASUREMENT OF WAGONS AT CHICAGO.

No.	Total Length, Including Horses.	Length with Horses Turned, Feet.	Width, Feet.
1	28½	17	7
2	22	12½	7
3	25	15	7½
4	31	22	8½
5	27	16	7½
6	27½	17½	7½
7	27½	17½	7
8	27	15½	7½
9	26	15	7½
10	25	14	7
11	26	15½	7½
12	26	17	7½
13	26	15½	7½
14	24	14½	7
15	25	15½	7½
16	25	15½	7½
17	25	15½	7½
18	28½	19	6

TABLE A—FREIGHT TERMINALS AT CHICAGO.

MEASUREMENTS OF DRIVEWAYS AND TEAMWAYS.

No.	Name of Railway.	Driveway or Teamway.	Location.	Width, Feet.
1	C., B. & Q.	Teamway	16th and Union	29½
*2	"	Driveway	Harrison	12½
3	"	Teamway	Polk	24½
4	"	"	"	19½
5	"	Driveway	"	14
6	"	Teamway	"	27
7	C. & A.	"	"	35
8	"	"	Van Buren	26
9	"	Driveway	"	62½
10	C., M. & St. P.	Teamway	Sangamon	18½
11	"	"	"	17
*12	"	Driveway	"	29
13	"	Teamway	Halsted	16½
14	"	"	Clinton	19
15	"	"	"	19
16	"	"	"	19
17	"	Driveway	"	30
*18	"	"	Jefferson	26½
*19	"	"	Desplaines	26½
*20	"	"	Union	26½
*21	"	"	Grand Avenue	36
22	"	Teamway	"	24
23	C. & N.-W.	"	16th and Jefferson	39½
24	"	"	State and Kinzie	30
*25	"	Driveway	"	16
26	"	"	N. Canal	66
27	C. T. T.	Teamway	12th and Ogden	28
28	C. & E. I.	"	12th and Clark	33
29	"	"	"	33
*30	"	Driveway	"	32
31	Wabash	Teamway	"	24
32	"	"	"	25
*33	C., R. I. & P.	Driveway	Taylor and Clark	37
34	C., R. I. & P.	Driveway	Taylor and Clark	35
35	"	Teamway	"	36
36	"	"	"	25
37	"	"	"	24
*38	A., T. & S. F.	Driveway	12th and State	28
39	Monon	Teamway	Taylor and Clark	27
40	N. Y. C. & St. L.	"	"	24
*41	"	Driveway	"	11
42	G. T.	Teamway	12th and Clark	28
43	L. S. & M. S.	Driveway	Pacific Ave	39
44	I. C.	Teamway	Randolph St. Pier	21½
45	"	"	"	25
46	"	"	"	25
47	"	"	"	25
48	"	"	"	25
49	W. C.	"	South Water	24
50	"	"	"	26
*51	"	Driveway	"	25
52	"	"	"	35
*53	M. C.	"	"	27
54	"	Teamway	"	37
55	"	"	"	29
*56	"	Driveway	"	25 to 13
57	P., C., C. & St. L.	Teamway	Green Street	21
*58	"	Driveway	"	29
*59	"	"	Milwaukee Ave	19½
*60	"	"	Halsted	33
*61	P., F. W. & C.	"	Van Buren	27
*62	"	"	N. of Van Buren	39
63	"	"	"	36
*64	"	"	S. of Madison	46
*65	"	"	"	34
*66	"	"	Madison	22

TABLE B CHICAGO & NORTH-WESTERN RAILWAY.

FREIGHT HOUSES AND TEAM TRACKS IN CHICAGO.

NAME AND LOCATION.	Width of In Freight Houses.	Width of Out Freight Houses.	Length of Houses.	Width of Platform Outside of Freight Houses.	Width of Platform for Trucking between Tracks	Width of Driveway Between Tracks.	Width of Driveway at Freight Houses.	Grade.	Average Wagon Load.	Maximum Wagon Load.	Total No. Teams Daily.	Total Tonnage Daily.	Yard Capacity of Cars.	Amount of Square Feet of Floor Space.
	Ft.	Ft.	Ft.		Ft.	Ft.	Ft.		Tons	Tons		Tons		Sq. Ft.
State Street	79	.....	370	No.	No.	....	55	Level	½	7	.....	.....	10	29,230
" "	....	62	674	No.	No.	....	47	.....	1	5	540	540	82	41,788
" " Team Tracks	.....	.....	.....	.....	....	23	.....	.....	.....	.....	.....	.....	40	.....
Canal St. Platform (Out Frt. only)	.....	.....	135	.....	12	....	41	Level	½	6	150	75	8	1,620
Clinton Street Team Track	....	.....	.....	.....	....	...	19	Level	3	6	400	1,200	200	.....
Western Avenue Platform		.....	135	.....	12	....	40	Level	½	6	60	30	4	1,620
" " Team Track	.....	.....	.....	.....	....	40	.....	Level	.....	.....	.....	.....	10	.....
16th Street Freight House		76	435	.....	41	....	33	Level	½	7	400	250	84	17,835
" " Storage (Out Freight)	....	34	460	6′ 7″	....	....	23	Level	1	7	80	80	15	15,640
" " Team Track	.....	.....	.....	.....	....	38	.....	.....	5	9	125	625	90	.....
Grand Avenue (1)	66	.....	558	7′ 8″	....	....	40	Level	¾	5	500	325	18	36,828
" " In Freight (2)	41	.....	445	7′ 8″	....	....	65	Level	2	6	30	60	14	18,245
" " (1)	....	50	290	8′	....	...	65	Level	½	7	600	475	88	44,740
" " Out Freight (2)	....	72	420	.....	.....	....								
" " Team Track	.....	.....	.....	.....	....	30	.....	.....	4	9	500	2,000	300	.....
Wood Street Transfer House	....	76	435	8′ 1″	....	....	.....	.....	.....	.....	.....	.....	104	34,228
Platform	...	.....	408	.....	16	....	.....	.....	.....	.....	.....	.....	65	6,528
Covered Platform	.....	.....	754	.....	16	....	.....	.....	.....	.....	.....	.....	125	12,064

Total length of wagon, including horses, 28 ft. Length of wagon with horses turned, 16 ft. Width of wagon, 7 ft. 6 in.

TABLE C—NEW YORK CENTRAL &

FREIGHT HOUSES AND TEAM TRAFFIC IN

Nearest Station.	Name of Freight House.	Width of House.	Platform Along Outside of House.	
			Location.	Width.
	Barclay St. Piers	48.0		
	"	45.0		
	" Blk. Hd.	53.0		
St. Johns Park	St. Johns Park	440.0	Beach St. Side.	5.0
"	"		Laight "	4.4
"	"			
"	"			
"	"			
Thirtieth Street.	W. Bound Freight House.	36.3	W. of House..	89.4
"	" "		S. " ..	4.2
"	E. " "	49.6	N. Side ..	8.2
"	" "		W " ..	52.0
"				
"	Bulkhead Shed	44.4		
"				
"				
"	Hay Shed No. 1	52.0	N. Side	4.0
"	"			
"	" 2	53.7	S. Side	4.4
"	"			
"	Manhattan Market.. (	44.8	S. Side	5.8
"	" S. House (		N. " ..	10.3
"	" Market.. (			
"	" N. House (	45.2	S. Side	10.0
"	" Market		N. "	4.0
	Milk Platform.			
"	90th St. and 10th Ave...	None.		16.0
Sixtieth Street	Bulkhead Platform	"		12.0
"	Roadway			
Manhattan	Freight House	57.9	W. Side.	12.9
"	"		N. "	13.3
"	"		S. "	13.0
Spuyten Duyvil	"	25.0	W. "	6 0
"	"		E. "	8.0
"	"		S. "	8.0
Grand Central Station ...	Milk Depot	None.	N. Platform...	11.5
" "	"		S. " ..	11 5
Mott Haven	M. O. Yd. N. House	26.8	N. Extension.	15.9
"	" "		N. End.	19.5
"	" "		W. Side.	6.0
"	" S. House	28.0		
"	Driveway	None.		
Bronx Park	Freight House	14.9	E. Side.	5.9
"	"		N. "	9.9
"	Driveway			
William's Bridge	Freight House	13.7	E. Side.	5.3
"	"		S. "	10.3
"	"		W. "	5.2
Westchester Ave. Yard...	Milk Platform	None.		12.2
High Bridge	"	"		8.0 (
				12.8 (
Morris Heights	Siding	None.		None.
Van Cortlandt	Freight House	9.0	E. Side.	4.2
"	"		W. "	4.2

HUDSON RIVER RAILROAD.

THE CITY OF NEW YORK.

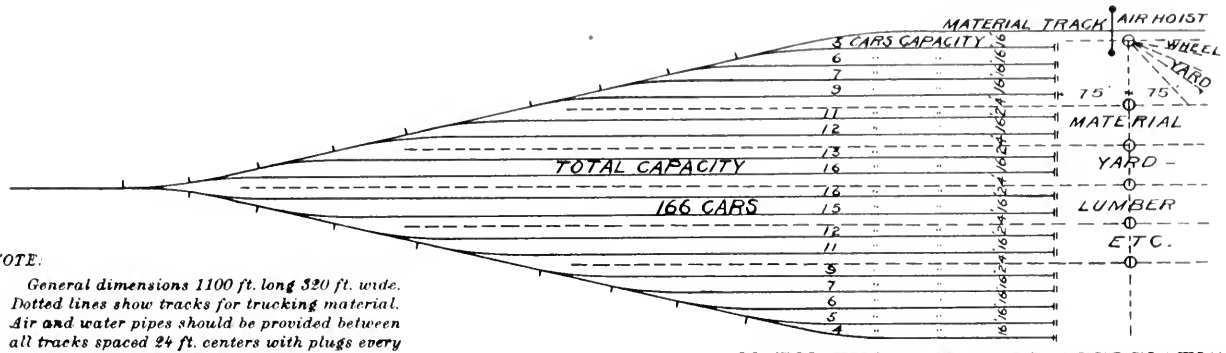
Width of Platform Between Tracks for Trucking.	Driveways Between Tracks. One or Both Sides Used.	Driveways Between Tracks. Width.	Driveways Not Between Tracks. One or Both Sides Used.	Driveways Not Between Tracks. Width.	REMARKS.
			Both	24.0	Between Platforms Nos. 4 and 5
			One	26.0	Between Platform No. 2 and a wall.
49.4					
			Both	59.6	Between East and West Bound Freight Houses.
			One	50.2	
	Both	34.0			Between 32d and 33d Streets.
	Both	35.0			Between 32d and 33d Streets
			One	29.0	
			One	29.0	
			One	40.0	"Driveway" is 34th Street.
	Both	34.0			Between the two Houses.
Bet. Tr. and Blk. Hd., 8 1			One	41.5	"Driveway" is 35th Street.
			Both	30.5	Sidetrack on South Side of Driveway.
			One	21.5	
			Both	69.0	Roadway is between Piers D and E. East of Office.
			One	30.0	
			One	St. over 100	
			One	35.0	
			One	55.0	
			Both	27.0	Milk Depot bet. 4th and Lexington Aves. and 48th St.
			One	37.0	
			Both	20.0	
			One	31.5	
			"	24.0	
			"	24.0	
			"	24.0	
			"	69.0	
	Both	35.9			
			One	25.5	
			"	25.5	Unload from Door in Freight House.
			"	34.0	
			"	L'rge Space	
			One	29.8	
			"	Open Space & Wide St.	
			One	16.0	
			"	35.0	Platform Near Street Line. Driveway is Width of St.

TABLE D.

FREIGHT HOUSES IN ST. LOUIS.

RAILWAYS.	Width Inbound and Outbound Freight Houses.	Width Platform Along Outside Freight Houses.	Width of Platform for Trucking Between Tracks.	Width of Driveways Where One or Both Sides are Used for Loading or Unloading. Clear Width.	Width of Driveways at Freight Station Where One or Both Sides Are Used for Loading or Unloading.	Street Grade in Business Districts.		Load of Wagons. Tons.		Total Length of Wagons, Including Horses.	Length of Wagons with Horses Turned in Feet.	Width of Wagons Over All.
						Average.	Maximum.	Average.	Maximum.			
Burlington—												
Franklin Ave.	133 ft.	None	None	20 ft.	E. Side, 38 ft. W. " 45 ft.	0.0	7%	5	10	25 to 28 ft.	15 to 18	5 ft. 6 in. to 8 ft.
O'Fallon St....	60 ft.	5 ft. 6 in	None	25 ft.	E. " 30 ft.	0.0	6%	5	10	25 to 28 ft.	15 to 18	5 ft. 6 in. to 8 ft.
M., K. & T., same as Burlington.												
St. L. Term. R.R.A.—												
Inbound	50 ft.	8 ft.	10 ft.	50 ft.	.....	.....	.....	.....	.....	.....	.....	.....
Outbound.....	133 ft.	None	10 ft.	.....	N. Side, 26 ft. S. " 50 ft.	.....	.....	.....	.....	.....	.....	.....
Wab. Dble. Deck—												
Up	72 ft. 6 in.	None	None	.....	.....	.....	.....	.....	.....	.....	.....	.....
Down	45 ft. 6 in.	4 ft. 6 in.	None	29 ft.	60 ft.	1%	5%	2	5	26 to 30 ft.	16 to 18	6 ft. 6 in. to 8 ft
Mo. Pac.—	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Biddle St.....	30 ft.	.....	.....	30 ft.	.....	.....	.....	.....	.....	.....	.....	.....
St. Louis & S. F.—												
Seventh St	119 ft.	None	None	S. Side, 28 ft. N. " 35 ft.	.....	1%	.....	2½	4	23 ft. 3 in.	15	6 ft.

TYPES OF CLUSTERS



NOTE.

General dimensions 1100 ft. long 320 ft. wide. Dotted lines show tracks for trucking material. Air and water pipes should be provided between all tracks spaced 24 ft. centers with plugs every 50 ft. for testing refrigerator and other cars.

Yard to be so located that it can be switched quickly and often when necessary.

Yard can be placed in any angles of ladder of yard.

Yard will frequently have to be built with one ladder, but wedge shaped yard is of advantage on account of uniformity in length of tracks.

Spacing of 16 ft. is for yard for light repairs.

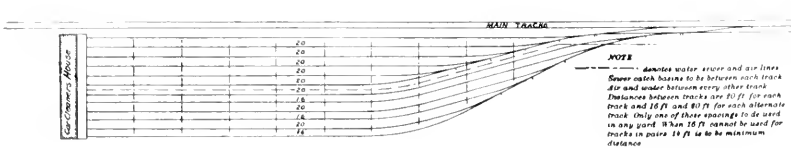
AM. RY. ENG. & M. OF W. ASSOCIATION.

COMMITTEE ON YARDS AND TERMINALS

CHICAGO MEETING, 1902.

TYPE OF CAR REPAIR YARD

0 100 200 300 400 500



AM. RY. ENG. & M. OF W. ASSOCIATION.

COMMITTEE ON YARDS AND TERMINALS

CHICAGO MEETING 1902

TYPE OF CAR CLEANING YARD

A.M. RY. ENG. & M. OF W. ASSOCIATION.
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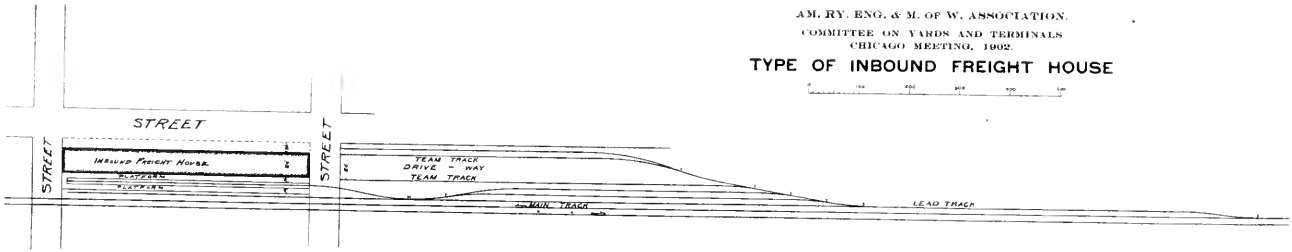
CHICAGO MEETING, 1902.

TYPE OF INBOUND FREIGHT HOUSE



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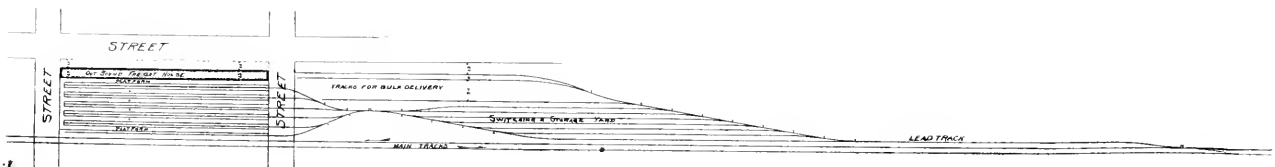
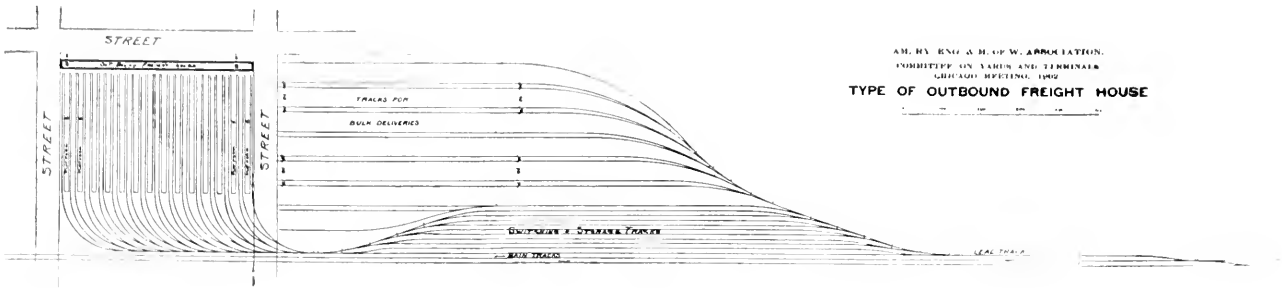
TYPE OF OUTBOUND FREIGHT HOUSE





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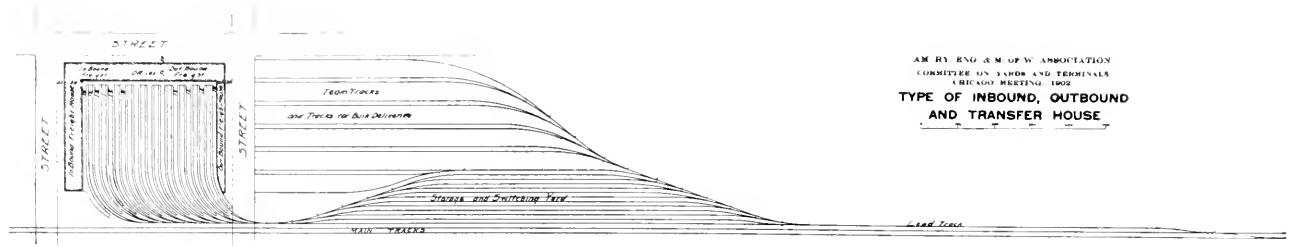
TYPE OF OUTBOUND FREIGHT HOUSE



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TYPE OF INBOUND, OUTBOUND AND TRANSFER HOUSE

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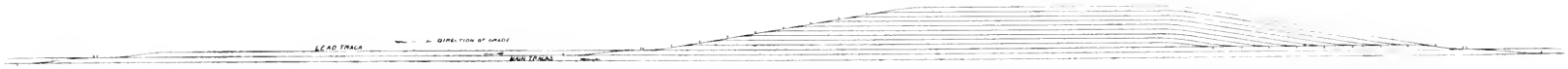
TYPE OF INDUSTRIAL DISTRICT YARD



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TYPE OF DIVISION TERMINAL YARD